

## **#1 Rule Safety First**

**Before we go on to the Primary Topic of Analyses,  
let's first re-visit the  
9 Key Skills to Start Every Day With**

- 1. Making your Bed**
- 2. Pushups**
- 3. Reading**
- 4. Language**
- 5. Mastery / Intelligence**
- 6. Language Building Blocks**
- 7. Data Management IS the Future**
- 8. Basic Essay**
- 9. Basic Engineering Concept**

## Types of Analyses

CITE: [<https://www.guru99.com/what-is-data-analysis.html>]

Data Cleaning – Now whatever data is collected may not be useful or irrelevant to your aim of Analysis, hence it should be cleaned. The data which is collected may contain duplicate records, white spaces or errors. The data should be cleaned and error free. This phase must be done before Analysis because based on data cleaning, your output of Analysis will be closer to your expected outcome.

Data Interpretation – After analyzing your data, it's finally time to interpret your results. You can choose the way to express or communicate your data analysis either you can use simply in words or maybe a table or chart. Then use the results of your data analysis process to decide your best course of action.

Data Visualization – Data visualization is very common in your day to day life; they often appear in the form of charts and graphs. In other words, data shown graphically so that it will be easier for the human brain to understand and process it. Data visualization often used to discover unknown facts and trends. By observing relationships and comparing datasets, you can find a way to find out meaningful information.

Text Analysis – Text Analysis is also referred to as Data Mining. It is a method to discover a pattern in large data sets using databases or data mining tools. It used to transform raw data into business information. Business Intelligence tools are present in the market which is used to take strategic business decisions. Overall it offers a way to extract and examine data and deriving patterns and finally interpretation of the data.

CITE: [<http://intellspot.com/types-statistical-analysis/>]

## Market Research Analysis –

- SWOT (Strengths, Weaknesses, Opportunities, Threats)

## SEO and Optimization for user search intent

## Financial Analysis

## Data Analysis –

- Descriptive Analysis
- Exploratory Data Analysis – an analysis approach that focuses on identifying general patterns in the data and to find **previously unknown relationships**.

The purpose of exploratory data analysis is:

- Check mistakes or missing data.
- Discover new connections.
- Collect maximum insight into the data set.
- Check assumptions and hypotheses.

EDA alone should not be used for generalizing or predicting. EDA is used for taking a bird's eye view of the data and trying to make some feeling or sense of it. Commonly, it is the first step in data analysis, performed before other formal statistical techniques.

- Inferential Analysis
- Causal Analysis
- Diagnostic Analysis
- Predictive Analysis
- Prescriptive Analysis
- Mechanistic Analysis – used in “Big Data”; understanding the exact changes in given variables that lead to changes in other variables. However, mechanistic does not consider external influences. The assumption is that a given system is affected by the interaction of its own components.

It is useful on those systems for which there are very clear definitions. Biological science, for example, can make use of Mechanical Analysis.

CITE: [<https://en.wikipedia.org/wiki/Analysis#Intelligence>]

This entire site [including links] should be thoroughly examined, but especially concentrate on the following:

### Science –

- The field of chemistry uses analysis in at least three ways: to identify the components of a particular chemical compound (qualitative analysis), to identify the proportions of components in a mixture (quantitative analysis), and to break down chemical processes and examine chemical reactions between elements of matter.
- A matrix [***mathematical term!!***] can have a considerable effect on the way a chemical analysis is conducted and the quality of its results.

### Business –

- Financial statement analysis – the analysis of the accounts and the economic prospects of a firm

- Fundamental analysis – a stock valuation method that uses financial analysis
- Technical analysis – the study of price action in securities markets in order to forecast future prices
- Business analysis – involves identifying the needs and determining the solutions to business problems
- Price analysis – involves the breakdown of a price to a unit figure
- Market analysis – consists of suppliers and customers, and price is determined by the interaction of supply and demand
- Opportunity analysis [aka Market Share Causation Analysis] – consists of customers trends within the industry, customer demand and experience determine purchasing behavior

### Computer Science –

- Requirements analysis – encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product, taking account of the possibly conflicting requirements of the various stakeholders, such as beneficiaries or users.

- Competitive analysis (online algorithm) – shows how online algorithms perform and demonstrates the power of randomization in algorithms
- Lexical analysis – the process of processing an input sequence of characters and producing as output a sequence of symbols
- Object-oriented analysis and design – à la Booch
- Program analysis (computer science) – the process of automatically analysing the behavior of computer programs
- Semantic analysis (computer science) – a pass by a compiler that adds semantical information to the parse tree and performs certain checks
- Static code analysis – the analysis of computer software that is performed without actually executing programs built from that
- Structured systems analysis and design methodology – à la Yourdon
- Syntax analysis – a process in compilers that recognizes the structure of programming languages, also known as parsing
- Worst-case execution time – determines the longest time that a piece of software can take to run



## Engineering –

- Analysts in the field of engineering look at requirements, structures, mechanisms, systems and dimensions. Life cycles and system failures are broken down and studied by engineers. It is also looking at different factors incorporated within the design.
- Computer Engineers look for faults in code when applying design.
- Chemical engineers look at how to deconstruct and reconstruct objects at a molecular level
- Systems engineers look at efficiency, Use Cases, faults, etc.
- Electrical engineers analyze systems in electronics.
- Mechanical engineers design power-producing machines, such as electric generators, internal combustion engines, and steam and gas turbines, as well as power-using machines, such as refrigeration and air-conditioning systems – their focus being on the interaction of moving parts (e.g. hinges, gears, pistons, etc.) as well as parts that should hold mechanisms in place (fasteners, nuts/bolts, welds)
- Structural Engineers look at how forces act upon a static object:
  - Burden (weight distribution) – “how much load a beam can hold”

- Torsion/Torque/Tension [think “twisting”]
- Compression [pushing in from at least 2 opposite sides]
- Expansion/Tensile [pulling / resistance to pulling]
- Shear Force (Tensile+Compression)
  - Wind shear
  - Bar shear [2 opposing forces pushing without twisting]

Systems Analysis – conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose. Analysis specifies what the system should do.

Intelligence Analysis –

- The field of intelligence employs analysts to break down and understand a wide array of questions. Intelligence agencies may use heuristics, inductive and deductive reasoning, social network analysis, dynamic network analysis, link analysis, and brainstorming to sort through problems they face.

- Military intelligence may explore issues through the use of game theory, Red Teaming, and wargaming.
- Signals Intelligence applies cryptanalysis and frequency analysis to break codes and ciphers to break codes and ciphers. Business intelligence applies theories of competitive intelligence analysis and competitor analysis to resolve questions in the marketplace.
- Law enforcement intelligence applies a number of theories in crime analysis.

#### Music Analysis –

- Diatonic
- Chromatic
- Counterpoint
- Schenkerian

#### Signal processing –

- Finite element analysis – a computer simulation technique used in engineering analysis

- Independent component analysis
- Link quality analysis – the analysis of signal quality
- Path quality analysis
- Fourier analysis [***mathematical term!!***]

### Statistical Analysis –

- Analysis of variance (ANOVA) – a collection of statistical models and their associated procedures which compare means by splitting the overall observed variance into different parts
- Boolean analysis [***mathematical term!!***] – a method to find deterministic dependencies between variables in a sample, mostly used in exploratory data analysis
- Cluster analysis [***mathematical term!!***] – techniques for finding groups (called clusters), based on some measure of proximity or similarity
- Factor analysis – a method to construct models describing a data set of observed variables in terms of a smaller set of unobserved variables (called factors)
- Meta-analysis – combines the results of several studies that address a set of related research hypotheses

- Multivariate analysis [***mathematical term!!***] – analysis of data involving several variables, such as by factor analysis, regression analysis, or principal component analysis
- Principal component analysis – transformation of a sample of correlated variables into uncorrelated variables (called principal components), used in: exploratory data analysis
- Regression analysis [***mathematical term!!***] – techniques for analyzing the relationships between several predictive variables and one or more outcomes in the data
- Scale analysis (statistics) – methods to analyze survey data by scoring responses on a numeric scale
- Sensitivity analysis – the study of how the variation in the output of a model depends on variations in the inputs
- Sequential analysis – evaluation of sampled data as it is collected, until the criterion of a stopping rule is met
- Spatial analysis [***mathematical term!!***] – the study of entities using geometric or geographic properties
- Time-series analysis – methods that attempt to understand a sequence of data points spaced apart at uniform time intervals

Mathematics – Modern mathematical analysis is the study of infinite processes. It is the branch of mathematics that includes calculus. It can be applied in the study of classical concepts of mathematics, such as real numbers, complex variables, trigonometric functions, and algorithms, or of non-classical concepts like constructivism, harmonics, infinity, and vectors.

Florian Cajori explains in *A History of Mathematics* (1893) mathematical analysis, as follows:

The terms synthesis and analysis are used in mathematics in a more special sense than in logic.

The analytic method is not conclusive, unless all operations involved in it are known to be reversible.

To remove all doubt, the Greeks, as a rule, added to the analytic process a synthetic one, consisting of a reversion of all operations occurring in the analysis. Thus, the aim of analysis was to aid in the discovery of synthetic proofs or solutions.

Main branches –

- Real analysis
- Complex analysis
- Functional analysis
- Differential equations
- Measure theory
- Numerical analysis